Remarks:

Claim 1 covers a method of cementing with an unfoamed cement slurry including 30 to 100% (by weight of cement) of rubber particles in the 250 – 425 μm range.

The examiner has rejected the claims under 35 USC 103(a) as obvious over Brothers '787 or '069, alone. In paragraph 4 of the office action, it is stated that Brothers et al disclose all features of claim 1 including

- rubber particles in the 250-425 μm range;
- and a density under 1.7g/cm3

It is further stated that Brothers et al. discloses the use of a dispersing agent and that it would have been obvious to pick one of the antifoaming type.

Applicants respectfully disagree.

Brothers '787 discloses resilient cement compositions including 10/20 mesh, 20/30 mesh and ¼ in. rubber particles that are in the 10/20 to 20/30 mesh ranges. As disclosed in paragraph 10, and confirmed by the attached brochure, 10/20 mesh particles are in the 850-2000 μm range while 20/30 particles are in the 600-850 μm. The ¼ in. particles correspond to about 6350 μm. In other words, Brothers '787 discloses the use of rubber particles within the 600 to 6350 μm range. There is no disclosure of the 250-425 μm range.

Moreover, the smaller particles (20/30 mesh range) of Brothers '787 are not portrayed as providing better results than the coarser particles. For instance in Table 5, where the only modification is the particle sizes, higher expansions are obtained with 10/20 mesh rubber than with 20/30 mesh. Therefore Brothers definitely fails to provide any motivation for one skilled in the art to use particles smaller than the "small" particles of Brothers '787 .

In all the examples of the present application, 40 U. S. mesh particles were used, except in example 3 of the present application (in which it was shown that even particles

only slightly larger but as small as 500 microns (32 U. S. mesh) are too large and give a formulation that is not API mixable and with which a portion of the rubber remained on the surface). Again there is no motivation in Brothers'787. to move to a smaller particle size. In fact the current specification suggests that suitable rubber particles may be obtained by grinding rubber particles having the sizes suggested by Brothers '787. Applicants have found that a narrow size range, significantly smaller than that suggested by the prior art, results in exceptional properties.

The second Brothers reference (Brothers '069) is totally silent as to the rubber particle size.

The second point is the slurry density. There is no disclosure of the density of the compositions alleged in Brothers '787, nor can the density of the compositions be actually derived from the disclosure since the densities of the composition constituents are not given.

If we use typical densities for the compositions recited in Brothers '787 (i.e. 3.16 g/cm^3 for the class H and class A cements and 1.2 g/cm^3 for the rubber particles (see paragraph 20 of the present application)), the slurry density of the different formulation in Brothers '787 can be estimated.

For instance, with the formulation of Table 1, we get

	Weight	Density	Volume
Cement	100	3.16	31.65
Water	38	1.00	38
Rubber	10	1.20	8.33
Slurry	*148*	*1.90*	*77.98*

and

	Weight	Density	Volume
Cement	100	3.16	31.65
Water	46	1.00	46
Rubber	10	1.20	8.33
Slurry	*148*	*1.81*	*85.98*

By applying the same basic calculations to all formulations of Brothers '787, all compositions were estimated to have a density in the range 1.73 g/cm^3 to 2.28 g/cm^3, with the lightest slurries being those including 40%BWOC rubber and 38% water, which leads to a density of 1.73 g/cm^3. Note that the formulations with 54% water by weight of cement actually further include silica and sodium chloride so that the slurry density is actually higher than that of the other formulations.

There is no discussion of the need to achieve a low density in Brothers '787 nor is there any teaching how to achieve a density below 1.70 g/cm^3 as specified in claim 1 while incorporating rubber particles into the composition.

Brothers '069 does mention the use of rubber particles in cement slurries having a density in the range 9.5 to 14 pounds per gallon (1.7 g/cm^3 = 14.2 ppg) and as such is considered to be the closest prior art to the present invention. However, this reference achieves low density for the slurry only by the use of foam whereas the present invention can do this without the need to foam the cement. The present invention avoids the need to introduce the foaming agent and foam stabilizers into the cement and the need to provide a gas supply at the well site. This is achieved, at least in part, by the selection of the size range of the rubber particles. This size range is not found in either of the Brothers et al references, nor in any other prior art document in this field. Therefore, it cannot be obvious to select this particle size range to achieve a non-foamed composition as is currently claimed.

Regarding the addition of an antifoaming agent, note that the compositions of Brothers et al. '069 are foamed and include a foam stabilizer (see the paragraph bridging column 3 and 4). Therefore Brothers et al '069 certainly teaches away from adding an antifoaming agent.

Brothers et al. '787 is silent as to the addition of an antifoaming/foaming agent. All that can be said about such an addition, is that Brothers et al. '787 includes an open-ended list of possible additives and that "anti-foam" agents may be consider as "and the like" additives.

The compositions of Brothers et al. '787 include a dispersing agent. In her comments, the Examiner mentioned that "it is considered an obvious expedient to use an antifoaming type of dispersing agent within a cement composition for the purpose of preventing/eliminating foam." In the attached affidavit, Mr. Bruno Drochon shows that dispersing agents and antifoam agents are entirely different types of additives so that one skilled in the art actually could not make the choice proposed by the Examiner.

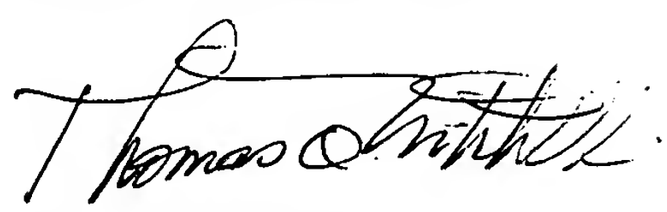
In conclusion, the formulations according to claim 1 differ from the prior art by at least 3 elements. Moreover, example 4 of the present invention (paragraph 40 to 43) shows that no proper formulation to 1.68 g/cm3 could be made by the inventors with rubber particles of 500 μm. So, the use of small particles appears to be a key parameter to achieve the properties of the slurries according to the invention.

Applicants submit that none of the references disclose or suggest the present invention, as claimed in the currently pending claims.

In the absence of any specific disclosure of particle sizes as small as those recited in the claims, it cannot be seen how the present invention can be considered as obvious, especially in light of the fact that larger particle sizes within the range of the cited references were shown in the application to be unsatisfactory. Since all of the pending claims are dependent on claim 1, they are likewise considered to be allowable.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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Date: June 17, 2004

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Attachments